

AMENDMENTS TO THE CLAIMS

1-17. (Cancelled)

18. (Currently Amended) A multi-joint drive mechanism comprising a flat-plate shaped bone-member layer member in which a plurality of bone members are arranged in arrays, the plurality of bone members being movably coupled at flat-plate shaped coupling portions, and ~~elastically expanding/contracting~~ elastic members which are arranged so as to stretch over the coupling portions on at least one of a contact-surface side of the bone-member layer member that makes contact with an object ~~and/or on its~~ and a noncontact-surface side of the bone-member layer member opposed to the contact-surface side, ~~and moreover which are the elastic members being fixed between the plurality of bone members, the elastic members being capable of at least one of expansion and contraction,~~

wherein the multi-joint drive mechanism drives flexural motions with the coupling portions between ~~the plurality of~~ adjoining bone members serving as joints by expanding or contracting the ~~elastically expanding/contracting~~ elastic members, and the multi-joint drive mechanism has a layer structure in which at least the flat-plate shaped bone-member layer member and the ~~elastically expanding/contracting~~ elastic members are arranged in a planar fashion.

19. (Currently Amended) The multi-joint drive mechanism as claimed in claim 18, wherein a degree of freedom of the coupling portions is given generally only by a degree of rotational freedom and the degree of freedom of the coupling portions at least of proximities of their forward ends is restrained to one degree of freedom about an axis generally perpendicular to a direction of the arrays of the bone-member layer member.

20. (Previously Presented) The multi-joint drive mechanism as claimed in claim 19, wherein the coupling portions are constructed by hinges each formed of a flat spring.

21. (Withdrawn – Previously Presented) The multi-joint drive mechanism as claimed

in claim 19, wherein the coupling portions are hinges formed of the bone members themselves by constricting a part of the bone members.

22. (Currently Amended) The multi-joint drive mechanism as claimed in claim 18, wherein a flexible wiring board having signal lines for connection of deformation sensors for detecting a deformation amount of the coupling portions, and drive lines for electrically driving the ~~elastically expanding/contracting~~ elastic members is disposed in proximities to flexural portions of the coupling portions.

23. (Withdrawn – Previously Presented) The multi-joint drive mechanism as claimed in claim 22 wherein the flexible wiring board serves also as hinges each formed of a flat spring.

24. (Currently Amended) The multi-joint drive mechanism as claimed in claim 18, further comprising a device for expanding or contracting the ~~elastically expanding/contracting~~ elastic member, the device being a device which is driven with air pressure applied to a rubber elastic member or a device which is driven by heating and cooling shape-memory material or a device which is driven with an electric field applied to an electro-active polymer.

25. (Withdrawn – Currently Amended) The multi-joint drive mechanism as claimed in claim 24, wherein the ~~elastically expanding/contracting~~ elastic member is formed of a rubber elastic member, and the device for expanding or contracting the ~~elastically expanding/contracting~~ elastic member is a device for performing drive by application of air pressure to the rubber elastic member, the multi-joint drive mechanism further comprising a multilayer-type pneumatic piping layer member having piping for applying air pressure to the rubber elastic member.

26. (Cancelled)

27. (Withdrawn - Currently Amended) A grasping hand having a plurality of finger mechanisms provided in opposition to each other, each of the finger mechanisms having a multi-joint drive mechanism which includes a flat-plate shaped bone-member layer member in which a plurality of bone members are arranged in arrays, the plurality of bone members being movably coupled at flat-plate shaped coupling portions, and ~~elastically expanding/contracting elastic~~ members which are arranged so as to stretch over the coupling portions on at least one of a contact-surface side of the bone-member layer member that makes contact with an object ~~and/or on its~~ and a noncontact-surface side of the bone-member layer member opposed to the contact-surface side, ~~and moreover which are the elastic members being~~ fixed between the plurality of bone members, the elastic members being capable of at least one of expansion and contraction, wherein the multi-joint drive mechanism drives flexural motions with the coupling portions between ~~the plurality of~~ adjoining bone members serving as joints by expanding or contracting the ~~elastically expanding/contracting elastic~~ members, and the multi-joint drive mechanism has a layer structure in which at least the flat-plate shaped bone-member layer member and the ~~elastically expanding/contracting elastic~~ members are arranged in a planar fashion,

and wherein the grasping hand performs a grasping operation for the object by expanding or contracting the ~~elastically expanding/contracting elastic~~ members to drive the finger mechanisms.

28. (Withdrawn - Currently Amended) The grasping hand as claimed in claim 27, wherein the grasping hand is enabled to grasp the object by the plurality of finger mechanisms provided in ~~oppositions~~ opposition to each other and has, at least on a grasping surface side of the grasping hand, touch sensors ~~such as pressure sensitive sensors or friction sensors~~, or displacement sensors for the coupling portions, or tag information detection antennas, wherein grasping operation is controlled based on information detected by the touch sensors, displacement sensors or antennas.

29. (Withdrawn - Currently Amended) The grasping hand as claimed in claim 27, wherein at least a part of ~~the~~ a grasping surface side of the grasping hand is covered with a high-

friction soft material ~~such as rubber~~.

30. (Withdrawn - Currently Amended) The grasping hand as claimed in claim 27, wherein the ~~elastically expanding/contracting member is~~ elastic members are provided on an outer side-face side of the grasping hand, the ~~elastically expanding/contracting member including~~ elastic members include both expansion type and contraction type ones so as to drive the grasping operation by antagonistic action of both types.

31. (Cancelled)

32. (Withdrawn – Currently Amended) A robot comprising:
a grasping hand having a plurality of multi-joint drive mechanisms, each of the multi-joint drive mechanisms having a flat-plate shaped bone-member layer member in which a plurality of bone members are arranged in arrays, the plurality of bone members being movably coupled at flat-plate shaped coupling portions, and ~~elastically expanding/contracting~~ elastic members which are arranged so as to stretch over the coupling portions on at least one of a contact-surface side of the bone-member layer member that makes contact with an object ~~and/or on its and a noncontact-surface side of the bone-member layer member~~ opposed to the contact-surface side, ~~and moreover which are~~ the elastic members being fixed between the plurality of bone members, the elastic members being capable of at least one of expansion and contraction, wherein each of the multi-joint drive mechanisms drives flexural motions with the coupling portions between ~~the plurality of~~ adjoining bone members serving as joints by expanding or contracting the ~~elastically expanding/contracting~~ elastic members, and has a layer structure in which at least the flat-plate shaped bone-member layer member and the ~~elastically expanding/contracting~~ elastic members are arranged in a planar fashion; and

~~a pressure-sensitive sensor, friction sensor or other~~ touch sensor, or a displacement sensor for the coupling portions provided on the grasping hand, whereby a grasping operation of the grasping hand is controlled based on information detected by the touch sensor or the displacement sensor or antenna.

33. (Withdrawn – Currently Amended) The robot as claimed in claim 32, further comprising a grasping-object information detection device, wherein the grasping-object information detection device is one of such as an ultrasonic type or image pick-up type or other a grasping object detection sensor or camera or a tag information detection antenna, whereby the grasping operation of the grasping hand is planned and controlled based on grasping-object information detected by the grasping-object information detection device.

34. (Withdrawn – Previously Presented) The multi-joint drive mechanism as claimed in claim 18, wherein the bone-member layer member has the plurality of bone members arranged in arrays and in a generally planar fashion.

35. (New) The grasping hand as claimed in claim 28, wherein the touch sensors are pressure sensitive sensors or friction sensors.

36. (New) The grasping hand as claimed in claim 29, wherein at least a part of the grasping surface side of the grasping hand is covered with rubber.

37. (New) The robot as claimed in claim 32, wherein the touch sensor is a pressure-sensitive sensor or a friction sensor.